

A NEW SPECIES OF BALSAMORHIZA (ASTERACEAE)
FROM THE SISKIYOU REGION OF
SOUTHWESTERN OREGON AND NORTHWESTERN CALIFORNIA

W. A. Weber

University of Colorado Museum, Campus Box 218, Boulder CO 80309

Balsamorhiza is composed of two subgenera which are morphologically and ecologically quite distinct. Subgenus Artorhiza contains three taxa, B. sagittata, B. careyana and B. deltoidea, characterized by being long-lived perennials of deep soils, with massive columnar roots crowned by numerous thick-cylindrical caudices. The leaves are large and triangular-cordate, and, except for the crenate-margined B. deltoidea, entire. These three taxa are well-isolated except in the Columbia Gorge where the western B. deltoidea comes in contact and hybridizes locally with the Central Washington-Oregon Basin B. careyana and where B. sagittata meets B. careyana in the central Washington Columbia Basin. Except for relatively local introgression the three taxa are distinct.

Subgenus Eubalsamorhiza, on the other hand, consists of a number of discrete populations scattered over western United States, quite isolated from each other. They are usually shorter-lived perennials of shallow, rocky "scabland" soils, and have a relatively slender erect-tuberous root surmounted with only a few caudices. One species at least (B. hookeri) is able to perennate by deep rhizomes coming off the lower portions of the main tap-root. The leaves are shallowly or deeply pinnatifid and each major population has discrete characters (if somewhat difficult to characterize in words), of leaf shape, texture and indument. In their mutual isolation, Eubalsamorhiza species do not hybridize with each other, but where they come in contact with taxa of Artorhiza, hybrid swarms are common along the margin of contact and introgression can be detected far into the population of the Artorhiza parent, while the Eubalsamorhiza parent population tends to remain fairly uncontaminated (Ownbey & Weber 1943).

Except for two proven and one suspected allopolyploid, the chromosome number $n=19$ is characteristic of both subgenera and the barriers to crossing are seasonal, spatial and ecological. Balsamorhiza macrophylla is a high polyploid (Helton et al 1972). It has the size of an extremely large Artorhiza but the leaf form of a Eubalsamorhiza, and it occurs together with an Artorhiza species (B. sagittata) without hybridizing. B. macrophylla is a putative allopolyploid having arisen from crossing of B. sagittata and B. hispidula. B. macrophylla var. idahoensis is another

allopolyploid, and *B. macrolepis*, a nearly or quite extinct species from the Central California Basin and Sierra Nevada foothills foothills, appears to be a third. The other species of *Eubalsamorhiza* form hybrid swarms wherever they come in contact with *Artorhiza* populations. It is highly likely that the morphological differences between populations of *Eubalsamorhiza* arose partially from gene drift in isolation and partly from varying amounts of genotypic contamination in the past from ancestral contacts with *Artorhiza*.

The phenomenon of two distinct subgenera (which could as well be treated as separate genera, since their morphology is so extremely different) showing virtually no hybridization within subgenera but no barriers to hybridization between subgenera, is an intriguing phenomenon.

Sharp (1935) published *Balsamorhiza* (*Eubalsamorhiza*) *platylepis*, based on type material from Washoe County, Oregon. His species, unfortunately contained two markedly discordant elements. *B. platylepis* is a species of the Sierra Nevada of California from Modoc and Shasta counties south to Nevada County. It is characterized, among other things, by having pinnatifid leaves, the pinnae of which are incised, and by having coarse strigose pubescence.

The material which Sharp cited from Oregon under this name is a narrow endemic confined to serpentine and having simply pinnatifid leaves, the pinnae of which are in almost all instances undivided, and by having a fine silky and lustrous appressed indument. Because the area of its provenance is under threat of mining and because the taxon soon will be classified as threatened or endangered, a name and description is provided below in advance of my proposed revision of the genus.

Balsamorhiza sericea, W. A. Weber, sp. nov., caulibus ca. 4 dm altis, infra et supra adpresso-sericeis, foliis pinnatifidis ca. 3.2 dm longis, segmentis sessilibus decurrentibus ovato-lanceolatis acutis vel obtusis ca. 4 cm longis et 1 cm latis integris vel raro vadoso-incisis supra et subtus dense adpresso-sericeis nitidis eglandulosis, bracteis involucri sericeis 3-4-seriatis disco aequantibus, exterioribus late-ovatis brevi-attenuatis 15-20 mm longis 7-8 mm latis.

HOLOTYPE: Oregon. Josephine Co.: 2 miles SW of O'Brien along Little Rock Creek, 1,500 ft. alt., in coarse cobble of dry streamside, 13 May 1953, Weber 8364 (COLO 277280). Cotype material of the same collection consists of six sheets, five of which (Weber 8364) represent mature flowering plants and a selection of

representative leaves from mature plants, and two sheets (Weber 8363) display seedling and 1-4-year-old plants with entire and slightly incised juvenile leaves.

DISTRIBUTION: Siskiyou Area of California and southwestern Oregon (Detling 1948), restricted to serpentine soils, specifically occupying screes and dry streambanks, rooted in coarse rounded cobbles.

SPECIMENS EXAMINED: Oregon. Josephine Co.: stony bottom of South Fork of Illinois River SW of O'Brien, 23 June 1952 (fruiting), Ownbey 3325 (COLO, WS); Deer Creek near Eight Dollar Mt., T38S R8W Sec9, 1500 ft. alt., 14 April 1940, Detling 4018 (WS, WTU, UC), 26 May 1923, Sweetser s.n. (ORE); Deer Creek 4 mi from Selma, 29 Mar 1926, Henderson 5703 (DS, RM, ORE), 13 Apr 1927, Thompson 2272 (WTU); hillsides near Waldo, Apr 1887, T. Howell (ORE, WTU); base of Oregon Mt., 2,000 ft. alt., 11 May 1934, Thompson 10282 (CAS, DS, WTU); on peridotite, McGrew Trail, Peridotite Range, T41S R9W Sec4, 1,900 ft. alt., 29 July 1949, Whittaker 272-S (WS).

California. Siskiyou Co.: ridge just above Grouse Lake, 5,700 ft. alt., 28 May 1950, Wiggins 12386 (UC, DS); on scree near highway, Scott Mountain, 31 May 1951, Vollmer & Beane 30 (DS); slopes, Siskiyou Mts. near O'Brien, 11 Apr 1934, Thompson 10282 (POM); Schoolhouse Hill, Plowmans Valley (Noyes Valley), E fork of Scott River, 12-16 June 1948, Ferris & Lorraine 11713 (DS, RSA, WTU, UC). Trinity Co.: Scott Mts., N of Carrville, 25 June 1937, Eastwood & Howell 4996 (CAS); summit of Scott Mountain, 9 June 1939, Cantelow 2675 (CAS).

At the type locality, *B. sericea* hybridizes with *B. deltoidea* Nutt. in the classic manner (Ownbey & Weber, l.c.), documented by Weber 8364b (four sheets, COLO).

REFERENCES CITED

- Detling, LeRoy E. 1948. Concentration of environmental extremes as the basis for vegetation areas. *Madrone* 9:169-185.
- Helton, N., D. Wiens and B. Barlow. 1972. High polyploidy and the origin of *Balsamorhiza macrophylla* (Compositae). *Madrone* 21: 526-535.
- Ownbey, Marion, & William A. Weber. 1943. Natural hybridization in the genus *Balsamorhiza*. *Am. J. Bot.* 30:179-187.
- Sharp, Ward M. 1935. A critical study of certain epappose genera of the Heliantheae-Verbesininae of the natural family Compositae. *Ann. Mo. Bot. Gard.* 22:51-152.